

NON-PUBLIC?: N
ACCESSION #: 9001250354
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Susquehanna Steam Electric Station - Unit 1

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DOCKET NUMBER: 05000387

TITLE: Generator Load Reject Caused by Switchyard Problems Results in
Automatic Reactor Scram
EVENT DATE: 12/24/89 LER #: 89-027-00 REPORT DATE: 01/19/90

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: H. Lloyd, Jr., Power Production Engineer

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COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 0824 hours on December 24, 1989, Unit 1 experienced a Reactor Protection System (RPS) actuation resulting in an automatic scram from 100% power. A loss of electrical power supply (primary and backup) to the 230KV Switchyard services resulted in tripping of main distribution system switchyard breakers and subsequent Main Generator load reject/main turbine trip. The RPS actuation was the result of main turbine control valve fast closure as per design. All major equipment operated during the transient per design and no additional Engineered Safety Feature (ESF) systems were challenged. This event has been determined to be reportable per 10CFR50.73 (a) (2) (iv), in that an unplanned ESF actuation occurred. Both power supplies to the 230KV switchyard were

lost due to unrelated events. The primary source was lost by a vehicle hitting a power line pole. The backup source was lost due to an electrical component failure in the backup generator exciter field circuit. Both power supplies were restored to service. A task force is evaluating the existing 230KV switchyard station services power supplies for reliability and for consideration of possible improvements.

END OF ABSTRACT

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Description of Event

At 0824 hours on December 24, 1989 with Unit 1 operating in Condition 1 at 100% power, a reactor scram occurred due to actuation of the Reactor Protection System (RPS;EIS Code JC). The scram was the result of a Main Generator (EIS Code TB) load reject and subsequent Main Turbine trip. The Main Turbine Control Valve fast closure provided the RPS actuation signal as per plant design. The Reactor Recirculation pumps tripped via the end-of-cycle recirc pump trip circuit. Two safety relief valves lifted momentarily and then reseated. The immediate operator actions of EO-100-101, Reactor Scram, were performed. The Feedwater Control system maintained Reactor Vessel level such that no ECCS systems were challenged. Required equipment response during the event was per design.

Cause of Event

A loss of electrical services power to the 230KV switchyard caused tripping of main distribution system breakers followed by the Unit 1 Generator synchronizing breaker trip. This resulted in the Main Generator load reject and reactor scram.

The 230KV switchyard is provided with a primary and backup power supply, both of which were lost. The primary supply from a 12KV line (fed from another utility) was lost when a vehicle hit a power line pole. The backup source was lost due to diode failures in the switchyard generator exciter field circuit. With power lost to the switchyard gas compressors, the main distribution breakers eventually tripped on low gas pressure causing the main generator load reject. These breakers are SF₆ (Sulfur Hexafluoride) pressure control breakers.

Reportability/Analysis

This event was determined to be reportable per 10CFR50.73 (a) (2) (iv) in that an unplanned Engineered Safety Feature (ESF) actuation occurred when the Reactor Protection System (RPS) initiated an automatic reactor scram.

The plant was safely shutdown and there were no safety consequences or compromises to the public health or safety nor would there have been under different initial operating conditions. This transient (Generator load rejection with bypass) has been evaluated in the FSAR chapter 15. Unit equipment response was as required and within design analysis. No additional ESF systems were challenged.

Corrective Actions

Electrical services power to the 230KV Switchyard was restored. The 12KV line (hit by vehicle) was repaired. The backup generator exciter field circuit was repaired by replacing the failed diodes. Fuses were installed in place of the exciter field breaker on a temporary basis. As a preventive measure, the exciter circuit breaker will be replaced. Following repairs to the 230KV switchyard power supplies, yard services were restored. The backup power supply was tested satisfactorily using existing procedures which are periodically performed to verify backup power supply operability. A task force was created to evaluate existing 230KV Switchyard station services for consideration of possible reliability improvements.

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Additional Information

Failed Components Identification: Not Applicable

Previously Reported Events with similar results but with dissimilar causes:

Docket No. 50-387 LER 84-034 Generator load reject, reactor scram. Phase-to-phase fault on 230KV line (tree contact).

Docket No. 50-387 LER 88-006 Generator load reject, reactor scram. Worker bumped 230KV yard span protection relay.

Docket No. 50-387 LER 88-010 Generator load reject, reactor scram. Apparent lightning strike on 500KV line caused misoperation of ground fault relay.

Docket No. 50-388 LER 85-025 Generator load reject, reactor scram. Lightning strike on 500KV line caused logic relay failure.

ATTACHMENT 1 TO 9001250354 PAGE 1 OF 1

Pennsylvania Power & Light Company

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January 19, 1990

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
LICENSEE EVENT REPORT 89-027-00
FILE R41-2
PLAS - 405

Docket No. 50-387
License No. NPF-14

Attached is Licensee Event Report 89-027-00. This report is being made pursuant to 10CFR50.73(a)(2)(iv), in that Susquehanna Unit 1 experienced an unplanned automatic actuation of an Engineered Safety Feature (ESF). The Reactor Protection System (RPS) actuated upon a Turbine Control Valve Fast Closure resulting from a Main Generator Load Rejection. The Generator Load Rejection was caused by problems originating in the 230KV Switchyard servicing the units electrical output.

H. G. Stanley
Superintended Plant - Susquehanna

HL/ml

Attachment

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